

REMARKS

Applicants' note with appreciation the Examiner's indication of allowable subject matter, namely the subject matter recited in Claims 12, 13, and 14. The following amendment amends Claim 12 to correct an antecedent basis error. No new matter has been added. The amendment to Claim 12 is not directed to any art rejection. Accordingly, we understand that any further rejection of any of Claims 1-16 based on new art is to be non-final.

Now in the application are Claims 1-16 of which Claim 1 is independent. Claims 17-31 have been withdrawn from consideration as a result of Applicants' election on July 9, 2003, without prejudice to Applicants' filing one or more divisional applications. The following comments address all stated grounds for rejection, and place the presently pending claims, as identified above, in condition for allowance.

Claim Objections

Claim 12 stands objected to for lack of formality. Specifically, the term "counter register" in line 10 of Claim 12 lacks antecedent basis. Applicants' amend Claim 12 to correct the identified informality. Applicants' respectfully request the Examiner to reconsider and withdraw the objection to Claim 12 for lack of formality.

Claim Rejections under 35 U.S.C. § 102

Claims 1, 2, 9-11, 15, and 16 stand rejected under 35 U.S.C. § 102. For ease of the discussion below each rejection under 35 U.S.C. § 102 is discussed separately.

A. Rejection of Claims 1, 2, 9-11, 15 and 16 under 35 U.S.C. § 102(b):

Claims 1, 2, 9-11, 15 and 16 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 4,658,407 of Iwama (hereinafter "Iwama"). Applicants' respectfully traverse this rejection and contend that Iwama does not anticipate Claims 1, 2, 9-11, 15 and 16.

Claims 2, 9-11, 15 and 16 depend directly or indirectly upon Claim 1 and therefore incorporate the novel features of Claim 1.

Claim 1 is directed to a thermal sensor to sense a temperature. The thermal sensor of Claim 1 includes an oscillator circuit to generate a first oscillating signal and a second oscillating

signal. The claimed thermal sensor further includes one or more counter circuits to perform a first count on the first oscillating signal and a second count on the second oscillating signal. The claimed counter circuit halts the second count when the first count reaches a predetermined value and upon the first count reaching the predetermined value the counter circuit asserts a value of the second count to indicate a response of the thermal sensor.

The Iwama reference does not anticipate the subject matter of Claims 1, 2, 9-11, 15 and 16. The Iwama reference is directed to an electronic clinical thermometer having a power shut off feature for discontinuing a temperature measurement at a prescribed time after the beginning of the temperature detection or upon detection of a measurement value. The electronic clinical thermometer of Iwama includes a thermometric oscillator circuit whose oscillation frequency varies in response to temperature and a reference oscillator circuit for outputting a reference clock. The Iwama reference does not disclose a thermal sensor having an oscillator circuit to generate a first oscillating signal and a second oscillating signal.

In contrast to the Iwama reference, Claim 1 recites a thermal sensor to sense a temperature that includes an oscillator circuit to generate a first oscillating signal and a second oscillating signal. Nowhere does Iwama disclose such a feature. The Iwama reference discloses two separate and distinct oscillator circuits, each disclosed oscillator circuit generates one oscillating signal. For at least these reasons, the Iwama reference does not disclose a thermal sensor to sense a temperature having an oscillator circuit to generate a first oscillating signal and a second oscillating signal. Accordingly, the Iwama reference fails to anticipate Claims 1, 2, 9-11, 15 and 16. Hence, Applicants' respectfully request the Examiner to reconsider and withdraw the rejection of Claims 1, 2, 9-11, 15 and 16 under 35 U.S.C. § 102(b).

B. Rejection of Claims 1, 2, 9, 15 and 16 under 35 U.S.C. § 102(b):

Claims 1, 2, 9, 15 and 16 stand rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5, 626,425 of Fujikawa, et al. (hereinafter "Fujikawa"). Applicants' respectfully traverse this rejection and contend that Fujikawa does not anticipate Claims 1, 2, 9, 15 and 16.

Claims 2, 9, 15 and 16 depend directly or indirectly, upon Claim 1 and thereby incorporate the novel features of Claim 1.

The Fujikawa reference is directed to an electronic thermometer with an audible temperature rise indicator. The electronic thermometer of Fujikawa includes a reference oscillator circuit which generates a reference signal and a thermosensitive oscillator circuit which generates a thermal sensitive signal whose frequency depends on a change in its temperature. Nowhere does the Fujikawa reference disclose a thermal sensor to sense a temperature having an oscillator circuit to generate a first oscillating signal and a second oscillating signal. Fujikawa discloses two oscillator circuits and each generate a single oscillating signal. In contrast, the thermal sensor of Claim 1 includes an oscillator circuit to generate a first oscillating signal and a second oscillating signal. Hence, the Fujikawa reference does not anticipate Claims 1, 2, 9, 15 and 16.

For at least these reasons, Applicants' respectfully request the Examiner to reconsider and withdraw the rejection of Claims 1, 2, 9, 15 and 16 under 35 U.S.C. § 102(b).

Claim Rejections under 35 U.S.C. § 103

Claims 3, 4, 5, 6, 7 and 8 stand rejected under 35 U.S.C. § 103. For ease of the discussion below, each claim rejection under 35 U.S.C. § 103 is discussed separately.

A. Rejection of Claims 3 and 4 under 35 U.S.C. § 103(a):

Claims 3 and 4 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Iwama in view of U.S. Patent No. 5,832,048 of Woodman, Jr. (hereinafter "Woodman"). Applicants' respectfully traverse this rejection and contend that Iwama in view of Woodman does not detract from the patentability of Claims 3 and 4.

Claims 3 and 4 depend, directly or indirectly, upon Claim 1 and therefore incorporate the novel features of Claim 1.

The Woodman reference is cited for teaching or suggesting a voltage regulator made up of an analog to digital converter, an arithmetic Fast Fourier Transform circuit and a digital to analog converter. The Woodman reference is further cited for teaching or suggesting a voltage controlled oscillator generating an oscillating signal based on a reference oscillator.

The Woodman reference fails to bridge the factual deficiencies of the Iwama reference. The Woodman reference is concerned with a digital phase lock loop control system and is not concerned with a thermal sensor to sense a temperature. Nowhere in the Woodman reference is there a teaching or suggestion of a thermal sensor to sense a temperature having an oscillator circuit to generate a first oscillating signal and a second oscillating signal.

Accordingly, Applicants' contend that the Iwama reference in view of the Woodman reference fails to teach and suggest each and every feature of Claims 3 and 4. Accordingly, Applicants' respectfully request the Examiner to reconsider and withdraw the rejection of Claims 3 and 4 under 35 U.S.C. § 103(a).

B. Rejection of Claims 3 and 4 under 35 U.S.C. § 103(a):

Claims 3 and 4 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over the Iwama reference in view of U.S. Patent No. 6,362,699 of Fry (hereinafter "Fry"). Applicants' respectfully traverse this rejection and contend that Iwama in view of Fry does not detract from the patentability of Claims 3 and 4.

Claims 3 and 4 depend, directly or indirectly, upon Claim 1 and therefore incorporate the novel features of Claim 1.

The Fry reference teaches or suggests a temperature compensating circuit for a crystal oscillator. Fry is concerned with a compensating circuit for a crystal oscillator that stabilizes the output frequency of the crystal oscillator over a desired temperature range. Fry is not concerned with a thermal sensor to sense a temperature.

The Fry reference fails to bridge the factual deficiencies of the Iwama reference. Nowhere in the Fry reference is there a teaching or suggestion of a thermal sensor to sense a temperature that includes an oscillator circuit to generate a first oscillating signal and a second oscillating signal.

Accordingly, Applicants' contend that the Iwama reference in view of the Fry reference fails to teach and suggest each and every feature of Claims 3 and 4. Accordingly, Applicants' respectfully request the Examiner to reconsider and withdraw the rejection of Claims 3 and 4 under 35 U.S.C. § 103(a).

C. Rejection of Claim 5 under 35 U.S.C. § 103(a):

Claim 5 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over the Iwama reference in view of U.S. Patent No. 5,193,387 of Hodate (hereinafter "Hodate"). Applicants' respectfully traverse this rejection and contend that the Iwama reference in view of the Hodate reference fails to detract from the patentability of Claim 5.

Claim 5 depends, directly or indirectly, upon Claim 1 and thereby incorporates the novel features of Claim 1.

The Hodate reference is directed to a tire interior monitoring apparatus. The Hodate reference is cited for teaching or suggesting a voltage controlled oscillator that outputs a signal of a frequency proportional to a voltage supplied from a temperature transducer. Nowhere in the Hodate reference is there a teaching or suggestion of a thermal sensor to sense a temperature having an oscillator circuit to generate a first oscillating signal and a second oscillating signal. As such, Applicants' contend that the Iwama reference in view of the Hodate reference fails to teach and suggest each and every feature of Claim 1.

Accordingly, Applicants' respectfully request the Examiner to reconsider and withdraw the rejection of Claim 5 under 35 U.S.C. § 103(a).

D. Rejection of Claim 6 under 35 U.S.C. § 103(a):

Claim 6 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Iwama in view of Hodate and further in view of U.S. Patent No. 5,892,408 of Binder (hereinafter "Binder"). Applicants' respectfully traverse this rejection and contend that Iwama in view of Hodate and further in view of Binder fails to detract from the patentability of Claim 6.

Claim 6 depends, directly or indirectly, upon Claim 1 and therefore incorporates the novel features of Claim 1.

The Binder reference teaches or suggests a method and system for calibrating a crystal oscillator. The Binder reference is cited for teaching or suggesting a voltage regulator to regulate an output value of a temperature dependent voltage source. The Binder reference fails to bridge the factual deficiencies of the Iwama reference and the Hodate reference. Nowhere in the Binder

reference is there a teaching or suggestion of a thermal sensor to sense a temperature that includes an oscillator circuit to generate a first oscillating signal and a second oscillating signal. Accordingly, Applicants' contend that the Iwama reference in view of the Hodate reference and further in view of the Binder reference fails to teach or suggest each and every feature of Claim 6. Accordingly, Applicants' respectfully request the Examiner to reconsider and withdraw the rejection of Claim 6 under 35 U.S.C. § 103(a).

E. Rejection of Claim 8 under 35 U.S.C. § 103(a):

Claim 8 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Iwama in view of Hodate and further in view of U.S. Patent No. 5,838,578 of Pippin (hereinafter "Pippin"). Applicants' respectfully traverse this rejection and contend that the Iwama reference in view of the Hodate reference and further in view of the Pippin reference fails to detract from the patentability of Claim 8.

Claim 8 depends, directly or indirectly, upon Claim 1 and thereby incorporates the novel features of Claim 1.

The Pippin reference teaches or suggests a programmable thermal sensor for an integrated circuit. The Pippin reference is cited for teaching or suggesting a silicon band gap reference circuit.

The Pippin reference fails to bridge the factual deficiencies of the Iwama reference and the Hodate reference. Nowhere in the Pippin reference is there a teaching or suggestion of a thermal sensor to sense a temperature that includes an oscillator circuit to generate a first oscillating signal and a second oscillating signal.

Accordingly, Applicants' contend that the Iwama reference in view of the Hodate reference and in further view of the Pippin reference fails to teach or suggest each and every feature of Claim 8. Accordingly, Applicants' respectfully request the Examiner to reconsider and withdraw the rejection of Claim 8 under 35 U.S.C. § 103(a).

F. Rejection of Claim 7 under 35 U.S.C. § 103(a):

Claim 7 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over the Iwama reference in view of the Fry reference and further in view of U.S. Patent No. 5,097,198 of Holmdahl (hereinafter "Holmdahl"). Applicants' respectfully traverse this rejection and contend that the Iwama reference in view of the Fry reference and further in view of the Holmdahl reference fails to detract from the patentability of Claim 7.

Claim 7 depends, directly or indirectly, upon Claim 1 and thereby incorporates the novel features of Claim 1.

The Holmdahl reference teaches or suggests a variable power supply with a predetermined temperature coefficient. The Holmdahl reference is cited for teaching or suggesting a temperature independent voltage source in a thermal sensor that comprises a band gap reference circuit.

The Holmdahl reference fails to bridge the factual deficiencies of the Iwama reference and the Fry reference. Nowhere in the Holmdahl reference is there a teaching or suggestion of a thermal sensor to sense a temperature that includes an oscillator circuit to generate a first oscillating signal and a second oscillating signal.

Accordingly, Applicants' contend that the Iwama reference in view of the Fry reference and further in view of the Holmdahl reference fails to teach or suggest each and every feature of Claim 7. Accordingly, Applicants' respectfully request the Examiner to reconsider and withdraw the rejection of Claim 7 under 35 U.S.C. § 103(a).

G. Rejection of Claim 7 under 35 U.S.C. § 103(a):

Claim 7 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Iwama in view of Fry and further in view of U.S. Patent No. 4,165,642 of Lipp (hereinafter "Lipp"). Applicants' respectfully traverse this rejection and contend that the Iwama reference in view of the Fry reference and in further view of the Lipp reference fails to detract from the patentability of Claim 7.

Claim 7 depends, directly or indirectly, upon Claim 1 and thereby incorporates the novel features of Claim 1.

The Lipp reference teaches or suggests a circuit for comparison of a temperature dependent junction voltage and a band gap reference voltage. The output of the comparison is converted to a binary coded decimal output signal to provide a temperature measurement. The Lipp reference is cited for teaching or suggesting a temperature independent voltage source comprising a band gap voltage reference circuit.

The Lipp reference fails to bridge the factual deficiencies of the Iwama reference and the Fry reference. Nowhere in the Lipp reference is there a teaching or suggestion of a thermal sensor to sense a temperature that includes an oscillator circuit to generate a first oscillating signal and a second oscillating signal.

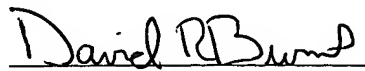
Accordingly, Applicants' contend that the Iwama reference in view of the Fry reference and in further view of the Lipp reference fails to teach or suggest each and every feature of Claim 7. Accordingly, Applicants' respectfully request the Examiner to reconsider and withdraw the rejection of Claim 7 under 35 U.S.C. § 103(a).

CONCLUSION

In view of the remarks set forth above, Applicants contend that Claims 1-16 presently pending in this application, are patentable, and in condition for allowance. If the Examiner deems there are any remaining issues, we invite the Examiner to call the undersigned at (617) 227-7400.

Respectfully submitted,

LAHIVE & COCKFIELD, LLP



David R. Burns
Attorney for Applicant
Reg. No. 46,590

28 State Street
Boston, MA 02109
Tel. (617) 227-7400

Date: **November 4, 2003**